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By-Grossman, Bruce D.

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It has been observed that following a brief period of isolation, children tend to show a greater increase in responsiveness on a simple motor task than nonisolated children do when verbal reinforcement is given periodically during a task. One explanation is that the social deprivation of the brief isolation heightens the motivation to receive social reinforcement. Another explanation is that the phenomenon is attributable to the generalized motivational properties of the anxiety which the condition of isolation arouses. Forty first-grade children were given a simple motor (marble drop) task after their anxiety level had been measured. After the child became familiar with the task, periodic verbal reinforcement was given as the child performed the task. An analysis of the data showed that response-rate increase over the task period (4 minutes) did not distinguish between high and low anxiety children. It was concluded from the overall findings that anxiety in young children is more likely to obstruct than facilitate performance on a simple motor task involving periodic social reinforcement. (WD)

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ANXIETY AS A FACTOR IN THE CHILD'S
RESPONSIVENESS TO SOCIAL REINFORCEMENT¹

Bruce D. Grossman
Hofstra University

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ANXIETY AS A FACTOR IN THE CHILD'S RESPONSIVENESS TO SOCIAL REINFORCEMENT¹

A. INTRODUCTION

A variety of explanations have been offered for the empirical observation, first reported by Gewirtz and Baer (2), that following a brief period of isolation there is a general tendency for children to show a relatively greater increase to responsiveness on a simple motor task than non-isolated children when these responses are paired with verbal inducements (e.g., "good", "fine").

Gewirtz and Baer (2, 3) have emphasized the social deprivation components of the isolation situation in their interpretation of the data. They have argued that the increased efficacy of the verbal reinforcement reflects the state of social deprivation aroused by their experimental manipulation, which in turn heightens the arousal of motivation to receive social reinforcement. More recently, the nature of the specific deprivation experienced in the isolation situation has been questioned, and the potential sensory deprivation components more thoroughly examined (5, 13), but the assumption of the essential condition of deprivation has been maintained; that is, it is assumed that the increased responsiveness of the child is based on properties of the reinforcement which rather specifically restore the deficiencies which the period of isolation has engendered.

A more clearly alternative explanation has been offered by Walters and Ray (17). Briefly, they have argued and found some support for the view that the effect noted by Gewirtz and Baer is attributable to the generalized motivational properties of the anxiety which the condition of isolation is apt to arouse. They feel that it is unnecessary to postulate a specific social drive to account for the apparently increased motivation of the child

following isolation. This explanation is predicated on the assumption that anxiety facilitates the task performance of young children, which lacks independent empirical verification.

Certainly, research with adults has provided considerable empirical evidence to indicate that, in general, anxiety tends to have a facilitating effect on the performance of simple tasks, while it is apt to interfere with the performance of more complex tasks (e.g., 8, 12, 14). However, few studies have been able to substantiate this observation with children, particularly those of the age group (first and second graders) employed by Gewirtz and Baer (2) and Walters and Ray (17). Most studies which have found a relationship between anxiety and task performance indicate that low-anxious children tend to perform better on learning tasks in general (7, 11, 14). In addition, Sarason et al. (10) present rather convincing evidence that anxiety in children generally interferes with intelligence test performance. Those investigators who have observed an interaction between anxiety and task complexity have studied older children (fifth and sixth graders) (1, 15).

Research efforts, specifically focussed on examining the nature and effects of anxiety in young children, would have implications for both the specific age groups investigated and more generally, for the theories concerning anxiety and its development. The present report provides data on the relationship between two measures of anxiety in first grade children and their performance on a simple motor task, prior to and following the administration of social reinforcement.

B. PROCEDURE

Subjects

The subjects (Ss) were 40 children (24 boys and 16 girls) drawn from two first-grade classes of a public school in Durham, North Carolina. The children ranged in I.Q. from 87 to 122 with a mean I.Q. of 107.6 according to the Kuhlmann-Anderson Scale, and judged from fathers' occupations, were predominantly from middle-class homes.

Anxiety Measures

The children's anxiety was assessed by two independent measures; a behavior observation and an anxiety scale. In the case of the behavior observation (BUO) each child was observed for a total of 5 separate 10-minute periods by a single observer.² The observations took place during the regular class period within a two-week interval during the spring of the school year. The observation periods were arranged so that three types of activities were sampled: (1) an independent work or reading activity; (2) a group participation activity and (3) a playground activity. Work and group activities were observed twice each, but time allowed for only a single 10-minute observation of the playground period.

Using a pre-arranged category system, the observers recorded the most prominent activity of the child during each 10-second interval.² This resulted in a minimum of 50 observations per child for each of the 5 10-minute periods since a single activity could be "double-scored" if the observer felt it was representative of two categories. The behaviors designated as indicative of anxiety were: (1) fear and worry, which included motor reactions to persons or objects suggesting that the child was frightened (e.g., startled) and verbal expressions of fear and worry; and (2) nervousness, including nail-

biting, restlessness when addressed, stuttering and voice tremor.

In order to familiarize the 4 observers with the category systems used to describe these activities a training period was utilized in which a different sample of first-grade children was observed. During the training period each of the observers was alternately paired with every other observer for the observation of a single child. Discussions following each observational period allowed for a clarification of the categories and for improved inter-observer reliability. By the time the observations of the reported sample of children were begun, an average inter-observer reliability of .80 had been reached.

The anxiety scale used was the General Anxiety Scale for Children (GASC) (10) with a slight modification for administration to a first-grade population. Test items referring to behavior not likely to be encountered by this age group (e.g., staying alone at night) were rephrased as hypothetical, and one test item (#39), which proved inappropriate in pretesting, was omitted. In addition, the test was administered individually, as opposed to the usual group administration, in order to assure that every child understood the test question. Even with younger children, the scale proved to be fairly reliable; split-half reliability, comparing the first and second half of the scale, was .80. Consistent with Sarason's (11) findings with older children, the 11 lie scale items correlated negatively (-.64) with the remaining items. This reflects the fact that children who score high on the lie scale tend to be generally defensive about their report of anxiety. In only one case was this effect so pronounced that one might suspect extreme distortion, so all cases were included. Contrary to Sarason's general finding with older children, the girls did not score higher than the boys on the GASC in this sample.

The comparison of low and high anxious children for both anxiety measures were based upon a median split in each case, which was done separately for boys and girls.

Social Reinforcement Task

The response measure used here was based upon the child's performance on a marble task similar to the one originally used by Gewirtz and Baer (2). The apparatus consists of a square black box on the top of which 5 holes are located. Several marbles were available in a shelf extending from the bottom of the box. The child was instructed to take one marble at a time, to put it into any of the holes and to continue doing so until he (she) was told to stop. Requiring the child to make a discrimination was avoided in order to make the task as simple as possible. On the other hand, pretesting indicated that providing a choice of several holes was necessary to assure the child's continued interest.

After a brief period in which the child demonstrated that "he knew the game", the formal testing period was begun. The male experimenter (the author) recorded the number of responses the child made during a given time period with the use of an electric counter which registered each time a marble passed through the hole and returned to the front shelf. The initial or base period lasted one minute, during which time no form of verbal encouragement was offered the child. The mean rate of response during this period was 20.10 for boys, and 23.09 for girls. The second to fourth minute of responding constituted the reinforcement period, during which the experimenter offered a verbal reinforcement (either "good", "fine" or "you play the game well") after every third response. The "increase" score is the difference between the initial rate of response and the average rate of response per minute for the 3-minute period following the introduction of social reinforcement.

C. RESULTS

The mean increase in response rate on the marble task over the 4-minute period is described in Figure 1. The increase in response rate for boys and girls is significant (Table 1) with the largest increment occurring between period 1 and 2, when reinforcement was first introduced. The initial difference between the performance of the boys and girls is not significant, but there is a significant difference in their overall response pattern (Table 1) with the girls showing the greater increase in rate over the 4-minute period.

Figure 1 and Table 1 about here

The high and low anxious children, as determined by either of the two measures of anxiety, do not differ significantly from one another in their initial response rate on the marble task. On the other hand, an analysis of variance (Table 2) reveals a significant interaction between the sex of the child and the effect of anxiety as measured by the questionnaire (GASC) on the increase in response rate following the introduction of social reinforcement.

Table 2 about here

The basis for the above-noted interaction becomes clear when one examines the mean increases in response rate (Table 3). The low anxious girls show a significantly greater increase in response rate than the high anxious girls. While there is a trend in the opposite direction for the boys which

nullify the main effect and contributes to the interaction.

The findings for the behavioral measure of anxiety (BUO) are similar, but in this case it is the boys who reveal the significant difference between anxiety groups in response increase (Table 3)

Table 3 about here

The low anxious boys show a significantly greater increase in response rate following reinforcement than do their high anxious counterparts, but the effect of anxiety, as measured by observation, appears to have little differential effect on the performance of the girls.

D. DISCUSSION

The role attributed to anxiety by Walters and Ray (17) in their explanation of the effects of social isolation on the child's responsiveness to social reinforcement is based upon two primary assumptions: (1) that anxiety is aroused in the isolation situation, and (2) that anxiety contributes to increased task performance. The present study provides data which call the second assumption into serious question. While we are dealing in this instance with measures of chronic anxiety as opposed to anxiety aroused in an experimental situation⁴, the implications of the findings are clear; anxiety in young children, either as a behaviorally manifested, or as a relatively conscious experience of apprehension, is more likely to interfere with than facilitate performance on a simple motor task, which is followed by social reinforcement.

These results are actually quite consistent with most previous observations of the relationship between anxiety and task performance in children, which were cited earlier. How might we account for the discrepancy between these observations and the general findings with adults and older children? A reasonable explanation for the present findings is that even with a simple task requirement the young child is apt to be more threatened than an older person by the relative unfamiliarity of the situation, and once this anxiety is aroused, is likely to be less able to deal with it.

The clinical literature abounds with the observation that children are less adequately equipped with ego or adaptive mechanisms, and are therefore particularly susceptible to feelings of vulnerability and anxiety. Indeed, Walters and Ray seem to accept this proposition in their assumption that merely leaving a child unattended in a relatively unfamiliar situation is likely to be anxiety provoking. Where there is typically more structure in the learning task situation, the strangeness of the experimenter and the setting, as well as the deliberate absence of social feedback during the base period, may well lead to the arousal of a debilitating degree of anxiety in the child. This explanation does not argue that the relationship between anxiety and task performance is necessarily different for children and adults. It suggests rather, that on a continuum of task complexity the point at which anxiety is apt to become debilitating occurs earlier for children than for adults. In a more familiar situation, for example, the child is not only likely to experience less anxiety, but he is also more likely to have developed constructive techniques to channel the anxiety which is aroused.

The data suggest that conditioning took place for both boys and girls, but as Parton and Ross (6) have recently pointed out, this conclusion

requires comparison with a control group. Since our primary interest was in the relative differences in performance related to anxiety, rather than in establishing the efficacy of social reinforcement itself, no control group was employed here.

An interesting finding here is the differential relationship between the sex of the child and task performance, for the two anxiety measures. It is apparent from the relatively low correlation between the anxiety measures ($r = +.22$ for boys, and $+.38$ for girls) that two essentially different aspects of anxiety are being tapped. This difference is also apparent from the operational description of the measures; the questionnaire is largely concerned with the conscious awareness of apprehension, while the behavioral measure is directed toward detecting anxiety as a motoric, rather than conceptual, manifestation.

In his review of the children's anxiety literature, Ruebush (9) has pointed out that since anxiety is generally considered to be a multi-dimensional construct, a variety of instruments should be employed in its measurement. The present findings support this view. Any attempt to explain the differential effect of the two types of anxiety being tapped here on the performance of boys and girls would necessarily be speculative. With this reservation, one hypothesis suggested by observation of the children during the task performance and by other data available on this subject group (4) is that the task seems to have had a different meaning for these boys and girls. While the boys appear to be responding to the intrinsic achievement features of the task; the girls tend to be more generally oriented to the social or interpersonal aspects of the situation. In this regard, it seems likely that it is their general "task orientation" which accounts for the boys' being particularly debilitated by the interfering effects of motorically expressed anxiety, while it is the girls'

tendency toward interpersonal concerns which is likely to make the conscious awareness of apprehension a more debilitating form of anxiety for them.

E. SUMMARY

A behavior observation and a questionnaire were used as independent assessments of anxiety in 40 first-grade boys and girls. The children also participated in a simple motor task (marble drop) situation. A 1-minute non-reinforcement (base-line) period was followed by a 3-minute social reinforcement ("good", etc.) period. No effect of anxiety was noted prior to the reinforcement period. Both boys and girls showed significant increases in response rate following reinforcement. For the high and low anxious groups determined (median split) by the behavioral measure, the low anxious boys showed a significantly greater increase in response rate following reinforcement than the high anxious boys, but there was no effect of anxiety for girls. For the groups determined by the questionnaire, the main effect of anxiety was not significant, but there was a significant interaction between anxiety and the sex of the child. The mean increase in response rate was significantly greater for the low anxious than for the high anxious girls, but there was no effect for boys.

FOOTNOTES

1. The author wishes to express his indebtedness to Lloyd Borstelmann for his guidance in conducting this study and to David Parton for his advice in preparation of the manuscript. Thanks are also extended to the Principal and first-grade teachers of the Morehead School for their cooperation.
2. The observers were: William Ward, Harris Stern, Joan Weber and Marie Chorborda.
3. Several other types of behavior were categorized for the purposes of other investigations involving these children.
4. This is also true for most of the studies with adults and older children which provide the original data on the relationship between anxiety and task performance.

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Table 1

Mean Increase in Response Rate on the Marble Task Following Reinforcement for High and Low Anxious Children

	Questionnaire (GASC)				Behavior Observations (BUO)			
	<u>N</u>	<u>Mean Increase</u>	<u>SD</u>	<u>t</u>	<u>N</u>	<u>Mean Increase</u>	<u>SD</u>	<u>t</u>
BOYS								
High A	12	5.76	2.47		11	3.96	2.10	
Low A	12	4.53	1.96	.84	12	6.09	2.45	2.13*
GIRLS								
High A	8	4.53	2.51		8	6.90	1.86	
Low A	8	8.30	2.54	3.17*	8	5.93	3.93	.45

*P < .01 (two-tailed test of significance)

Table 2

Analysis of Variance of the Overall
Response Rate on the Marble Task

Source	d.f.	MS	F
Treatment (Reinforcement)	3	356.13	41.65*
Subjects (Boys and Girls)	1	361.37	42.27*
Treatment x Subjects	3	8.55	
Error	152	41.96	

*P < .01

Table 3

Analysis of Variance of Increase in Response Rate
for High and Low Anxious Children

Source	d.f.	MS	F
Anxiety (GASC)	1	5.92	.977
Sex	1	15.50	2.558
Sex x Anxiety	1	60.30	9.950*
Error	36	6.06	
Anxiety (BUO)	1	10.00	1.387
Sex	1	20.28	2.813
Sex x Anxiety	1	19.79	2.745
Error	35	7.21	

*P < .01